TABLE 1.—*Laboratory data in case of meningoencephalitis*

| | May 13 | May 15 | May 16 | May 18 | May 20 | May 24 | May 28 |
|---|---|---|---|---|---|---|---|
| *Blood* | | | | | | | |
| Hemoglobin (gm. per 100 cc.) | 13.8 | | | | | | 13.6 |
| Leukocytes (per cu. mm.) | 6,900 | 15,400 | 11,000 | 11,000 | 12,200 | 11,000 | 7,200 |
| Neutrophils per cent: | | | | | | | |
| Segmented | 31 | 69 | 46 | 30 | 29 | 34 | 66 |
| Non-segmented | 7 | 10 | 16 | 6 | 9 | 14 | 8 |
| Lymphocytes | 62 | 12 | 35 | 64 | 60 | 45 | 25 |
| Atypical (per cent) | 70 | 50 | 90 | 70 | 50 | 80 | 30 |
| Monocytes | | | 3 | | | | |
| Eosinophils | | | | | 2 | | |
| Heterophil titer (guinea pig absorption) | 1:10 | | | 1:20 | 1:80 | 1:80 | 1:160 |
| Sedimentation rate (mm. per hour Wintrobe) | 7 | | | | | 16 | 7 |
| *Cerebrospinal fluid* | | | | | | | |
| Appearance | | clear | | clear | | | |
| Pressure (mm. water) | | 110 | | 135 | | | |
| Cells | | | | | | | |
| Leukocytes (cu. mm.) | | 10 | | 6 | | | |
| Lymphocytic (per cent) | | 80 | | 5 | | | |
| Sugar (mg. per cent) | | 108 | | 73 | | | |
| Protein (mg. per cent) | | 175 | | 90 | | | |
| Gold curve | | 1112231100 | | 0001110000 | | | |
| Wassermann | | | | Neg. | | | |
| Chlorides (mg. per cent) | | | | 638 | | | |
| Heterophil antibody titer | | | | 1:10 | | | |

negative. Complement fixation studies on the serum for western equine encephalitis, St. Louis encephalitis and mumps were negative. Electrolyte studies of the serum during the phase of polyuria were within normal limits. No abnormalities were noted in liver function studies. Hemolytic staphylococcus aureus grew on cultures of material taken from the throat.

### COMMENT

The cause of infectious mononucleosis is unknown, but the concept of a virus as the infecting agent is generally held by most authorities. The pronounced variability from case to case in symptomatology, physical findings and the duration of illness make this a most bizarre disease. If central nervous system symptoms are present, they may appear at the onset, although most commonly they do not occur until one to three weeks after onset.

In the case reported upon herein, the central nervous system manifestations appeared during the first week of his illness. The appearance of the pharyngeal exudate and the enlargement of lymph nodes were initially suggestive of the diagnosis. The confirmatory laboratory studies and the rising heterophil titer substantiated it. The spleen was never palpable.

The clinical picture produced by involvement of the nervous system may be indistinguishable from that caused by many other factors. Since the systemic signs of infectious mononucleosis may be minimal, it is important to realize the value of heterophil antibody tests in obscure cases of central nervous system symptomatology.

1555 Fifth Avenue, San Francisco 22 (Natzke).

### REFERENCES

1. Bernstein, T. C., and Wolff, H. G.: Involvement of the nervous system in infectious mononucleosis, Ann. Int. Med., 33:1120, 1950.

2. Dolgopol, V. B., and Husson, G. S.: Infectious mononucleosis with neurologic complications, Arch. Int. Med., 83:179, 1949.

3. Lawrence, J. S.: Infectious Mononucleosis, in Cecil, R. L., and others, editors: A Textbook of Medicine, pp. 73-77, 8th ed., 1951.

4. Schumacher, E. E., Jr., et al: Infectious mononucleosis and Guillain-Barre syndrome, Arch. Int. Med., 93:246, 1954.

5. Slade, J.: Involvement of the central nervous system in infectious mononucleosis, N.E.J.M., 234:753, 1946.

## Limited Chronic Tension Pneumothorax with Lobar Atelectasis

### *Two Cases Treated by Lobectomy and Decortication*

JOHN S. CHAMBERS, JR., *M.D.*, San Diego

CHRONIC PNEUMOTHORAX with positive pressure secondary to a pulmonopleural or bronchopleural fistula of valvular type occurs in many conditions[10] such as tuberculosis, pulmonary suppuration of other types, spontaneous rupture of emphysematous blebs and in empyemas in which the pus is coughed up and does not reform because of antibiotic therapy. Usually the involved lung is more or less uniformly collapsed but occasionally previous pleural symphysis limits the extent of pneumothorax so that collapse is localized to one or more lobes of a lung.

Two patients affected by limited tension pneumothorax with complete lobar collapse and suppuration were observed by the author within a month and both were treated by lobectomy and decortication.

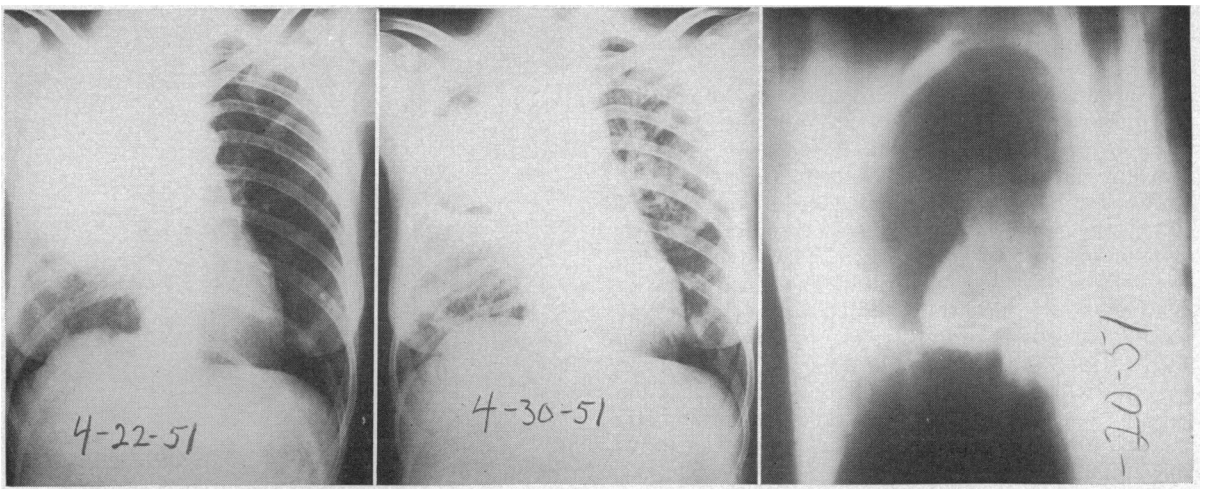


**Figure 1.—(*Left*) A solid density with lack of aeration in the upper two-thirds of the right lung field. (*Center*) Partial clearing of the density in the right upper lung field with two fluid levels and partial collapse of the upper lobe. The left lung shows a transient diffuse infiltration. (*Right*) Planigram showing the collapsed airless right upper lobe with surrounding pneumothorax.**

Reports of similar cases similarly treated were not noted in a summary review of the literature.

#### REPORTS OF TWO CASES

CASE 1. A 38-year-old housewife was admitted to San Diego County General Hospital April 22, 1951, with a history of onset of fever, general malaise and "flu-like" symptoms three weeks before. Two weeks before admittance she noted the onset of cough, productive of two tablespoonfuls of yellow-green sputum daily, and the cough persisted until admission. She also had mild diarrhea.

The patient appeared acutely ill and dehydrated when examined upon admittance. The temperature was 100.2° F. and the pulse rate 110 per minute. There were coarse rales, dullness and diminished breath sounds over the right upper quadrant of the chest posteriorly and anteriorly. The hemoglobin content was 6.6 gm. per 100 cc. of blood and leukocytes numbered 16,050 per cu. mm. An x-ray film of the chest (Figure 1) showed an airless density occupying the upper two-thirds of the right lung field. A Ghon's complex was present in the left lung field.

Penicillin was administered for three days, then aureomycin for a week, and then penicillin again until July 3, 1951. Four pints of blood was infused to correct anemia. The maximum daily temperature averaged 101° F. for the first week, 100.6° F. the second week, 99.6° F. the third week, and continued so for the next 12 weeks. The general condition of the patient improved gradually. The sputum decreased in amount but remained creamy in character. On May 4 thoracentesis was attempted at three different sites and only air was obtained. Thoracentesis was done again June 22 and again no fluid was withdrawn, but air was obtained and pressures were positive after removal of 200 cc. of air. Bronchoscopic examination was carried out and the tracheobronchial tree was normal except for redness

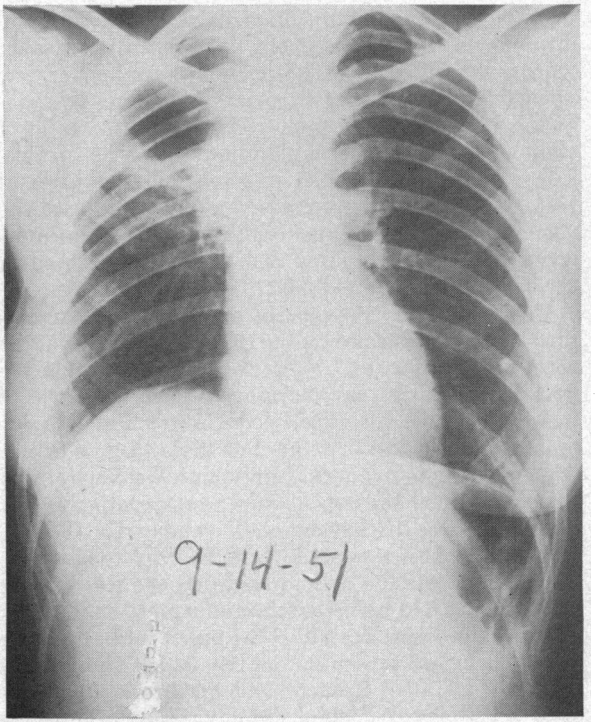


**Figure 2.—Preoperative film showing progressive clearing of the infiltration, the pneumothorax no longer containing any fluid, and further shrinking of the upper pocket lobe.**

and edema around the orifice of the right upper lobe. Purulent secretions were obtained from the bronchus serving this area and from the remainder of the right bronchial tree. X-ray films of the chest a week after admission (Figure 1) showed two air pockets with fluid levels and partial collapse of the upper part of the right lung associated with diffuse bilateral soft infiltration. Later films (Figures 1 and 2) showed progressive collapse of the upper part of the

right lung, with pneumothorax becoming more prominent, and disappearance of the fluid and clearing of the soft infiltration (Figure 1).

Concentrates and cultures of specimens of sputum taken April 23, May 1, May 23 and June 19 were negative for acid fast bacilli. A specimen obtained May 14 was negative on concentrate and positive on culture for acid-fast bacilli. Because of the positive culture the patient was transferred to the tuberculosis division of the hospital on July 3. There five consecutive daily sputum specimens were examined for acid-fast bacilli by concentrate and culture with negative results. On July 9 administration of dihydrostreptomycin, 1 gm. twice weekly, and para-amino-salicylic acid, 12 gm. daily, was started. By this time the patient was afebrile and practically asymptomatic except for expectoration of a small amount of purulent sputum.

On September 27 operation was done with the patient in the face down position, under pentothal-nitrous oxide-ether anesthesia. The right side of the chest was opened through the fifth intercostal space. The parietal pleural peel was freed from the chest wall by sharp and blunt dissection. The middle and lower lobes were normal but the pleural space over them was obliterated. The pneumothorax space was opened and the upper lobe was found to be completely collapsed, with small reddish elevated areas of what appeared to be granulation tissue on its surface. The upper lobe was then resected with the parietal peel, the bronchus being closed with 4-0 silk and the vessels individually ligated with 2-0 silk. Two intercostal tubes were inserted and the incision closed in layers with interrupted silk.

Postoperatively the patient did well, the temperature becoming normal on the third postoperative day from a high of 101.6° F. on the second day. On the first postoperative day, because of x-ray evidence of possible middle lobe atelectasis, bronchoscopic examination was carried out but atelectasis was not present. Streptomycin and para-amino-salicylic acid were continued for two months postoperatively, and the patient was discharged on November 13, 1951. A film of the chest was made June 6, 1952 (Figure 3) and at that time the patient said that she was feeling fine and had had no recurrence of symptoms.

The pathologist described the upper lobe specimen as a "shrunken irregular nubbin which showed dilated thick walled bronchi and peribronchial fibrosis." There was no gross nor microscopic evidence of tuberculosis, and there was no growth of acid-fast bacilli on cultures of material from the pleura and the upper lobe.

The diagnosis was: (1) Chronic fibrous pleuritis; (2) bronchiectasis and pulmonary fibrosis.

#### COMMENT ON CASE 1

In this patient there was right pleural effusion limited to the upper lung field. The effusion produced upper lobar collapse and probably became infected, although there is no definite proof that the fever, leukocytosis and signs of inflammation were from empyema rather than from pulmonary suppuration. Treatment with antibiotics apparently controlled the infection but a fistula developed between the pleural space and the lung or bronchus, as serial films showed progressive increase of air and decrease of fluid in the pleural cavity with concomitant collapse of the upper lobe.

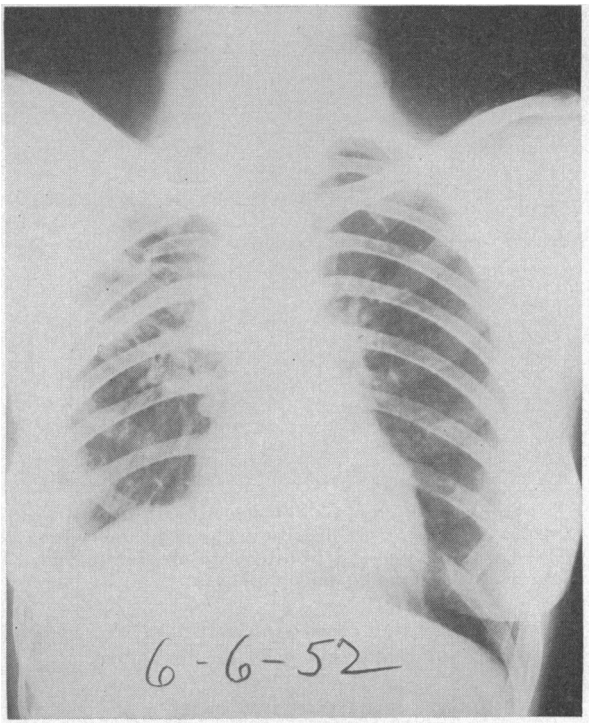


Figure 3.—After decortication and right upper lobectomy. Note good expansion of the remaining lobes.

In light of all the evidence it seems the isolated culture showing acid-fast bacilli was probably a laboratory error, unless (improbably) there was originally a tuberculous effusion secondary to parenchymal tuberculosis in either the middle or lower lobe.

CASE 2. A 45-year-old woman was admitted to Balboa Hospital Sept. 6, 1951, with chills, fever, cough productive of up to a cupful of yellow sputum daily for a week and loss of 20 pounds in body weight and general malaise.

Fifteen months previously the patient had had a similar attack accompanied by pain in the right side of the chest for several weeks. She had been treated elsewhere with penicillin.

Upon examination the patient seemed acutely ill and a "wet" cough was noted. The temperature was 101.2° F. Shotty, freely moveable nodes were palpated in the cervical and axillary regions. There were diminished to absent breath sounds and tactile fremitus over the lower part of the chest on the right side both anteriorly and posteriorly. The motion of the chest wall was normal.

An x-ray film of the chest (Figure 4) showed an area of increased radiolucency at the right base with absence of lung markings and depression of the right diaphragm. There was also a sharply demar-

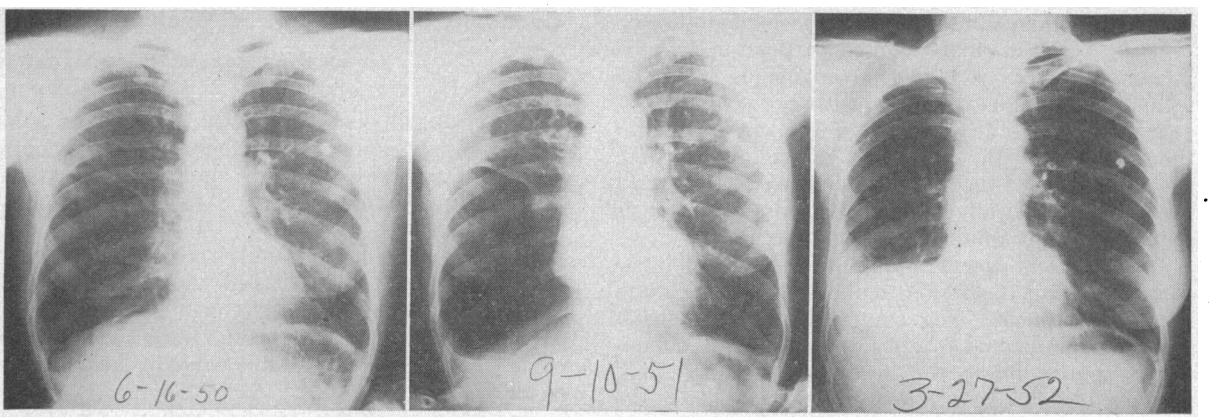


Figure 4.—(*Left*) Pneumothorax limited to the right lower lung field. (*Center*) More extensive pneumothorax with some atelectatic lung tissue along the right border of the heart. (*Right*) Film taken six months after decortication and right lower and middle lobectomy. Note good expansion of the remaining upper lobe.

cated mass at the right border of the heart which was thought to be collapsed lung tissue. The left lung field showed a Ghon's complex.

Penicillin was administered and the temperature became normal on the third hospital day. The sputum became clear and was greatly reduced in amount. Bronchoscopic examination was carried out on September 10. There was reddened, edematous mucosa throughout the right lower bronchial tree, and purulent secretions were aspirated from the middle and lower lobe bronchi. The secretions were negative for fungi and acid-fast bacilli on smear and concentrate, and no malignant cells were observed on cell block examination.

A previous photofluorogram dated January 6, 1950, showed the chest normal except for the Ghon's complex on the left, and an x-ray film of the chest dated June 16, 1950, showed pneumothorax limited to the right lower quadrant without evidence of tension or atelectasis (Figure 4).

On September 12, 1951, the patient was transferred to Mercy Hospital and eight days later right thoracotomy was performed with the patient in the face down position under endotracheal pentothal-nitrous oxide-ether anesthesia. The pleural cavity was not entered until most of the pleural peel over the lower chest wall and diaphragm had been decorticated. The pleural space was obliterated except in the lower half of the chest where pneumothorax was present. Both the middle and the lower lobes were observed to be completely airless. As the visceral peel was dissected away, the lower lobe remained atelectatic and shrunken but the middle lobe expanded normally. The upper lobe was normal to palpation, the middle lobe contained areas of crepitation and fibrosis, and the lower lobe was collapsed and fibrotic. The middle and lower lobes were consequently resected, the bronchial stump being closed with interrupted 4-0 silk sutures. The diaphragm, which had been inadvertently stripped from its chest wall attachment for a distance of 3 inches, was resutured to the chest wall and two intercostal drainage tubes were inserted. The chest was closed with silk.

Postoperatively bloody discharge and air drained from the intercostal tubes for four days, necessitating transfusion and the application of suction to the intercostal catheters. The catheters were removed on the fifth postoperative day and the patient was discharged on the eighth postoperative day. She gained strength and returned to normal activities in about three weeks. Except for repeated "chest colds" she remained asymptomatic thereafter.

On examination by the pathologist both lower and middle lobes showed purulent exudate and dilatation of the bronchi. The lower lobe was airless and the middle lobe aerated only partially.

The diagnosis was: (1) Chronic fibrous pleuritis; (2) chronic interstitial pneumonitis with bronchiectasis of the middle and lower lobes.

### COMMENT ON CASE 2

In this patient the disease probably started with spontaneous pneumothorax secondary to a ruptured bleb. At that stage, aspiration, intercostal tube drainage or temporary phrenic paralysis might have resulted in expansion of the middle and lower lobes and prevented the onset of suppuration in them.

### DISCUSSION

Various methods have been advocated in the treatment of chronic pneumothorax: (a) The use of irritants[5] to aid in attaining pleural symphysis (silver nitrate,[3] iodized talc,[9] etc.); (b) thoracoscopy[8] with lysis of adhesions, cauterization of blebs, or poudrage; (c) phrenic nerve interruption[4]; (d) closed (intercostal) catheter drainage[2] and (e) thoracotomy[1, 2, 6, 7, 10, 11, 12] with excision of blebs, closure of fistulae, resection of diseased lung and decortication of the thickened peel (extrapleural lobectomy).

It is felt that in the two patients presented here anything short of thoracotomy, decortication and resection would have failed to obliterate the space and relieve the symptoms. The main indication for operation in both patients was pulmonary suppura-

tion rather than obliteration of the pneumothorax.

It is believed that total decortication of the pneumothorax pocket was advantageous from the technical as well as the therapeutic point of view.

In the first case it was debated whether to perform thoracoplasty with the intent of obliterating the space. In view of the operative finding of thick peel over the chest wall and upper mediastinum it is doubtful that it would have been successful.

In the second case a combination of closed intercostal drainage, phrenic nerve interruption and pneumoperitoneum was contemplated but considered contraindicated in view of the obvious pulmonary suppuration in the lower and middle lobes, because the chance of thus effecting relief of the attacks of fever, cough and expectoration seemed remote. Likewise the threat of empyema developing seemed great.


#### SUMMARY

The case histories of two patients with limited or localized chronic tension pneumothorax are presented. The cause of the pneumothorax in one case was probably suppurative pneumonitis with localized effusion and in the other probably rupture of an emphysematous bleb. In both patients total lobar collapse and suppuration were present and both were treated by complete decortication and resection of the involved lobes.



1205 Medico-Dental Building, 233 A Street, San Diego 1.


#### REFERENCES


1. Brewer, III, L. A., Dolley, F. S., and Evans, B. H.: The surgical management of chronic "spontaneous" pneumothorax, J. Thor. Surg., 19:167, 1950.

2. Briggs, J. N., Walter, R. W., and Byron, F. X.: Spontaneous pneumothorax, Dis. of Chest, 24:564, 1953.

3. Brock, R. C.: Recurrent and chronic spontaneous pneumothorax, Thorax, 3:88, June 1948.

4. Goldschmidt, W.: Phrenicusausschaltung beim pathologischen Pneumothorax, Wein. klin. Wchnschr., 44:1276, 1931.

5. Hennell, H., and Steinberg, M. F.: Tense pneumothorax: Treatment of chronic and recurrent forms by induction of chemical pleuritis, Arch. Int. Med., 63:648, 1939.

6. Horsley, J. S., and Bigger, I. A.: Lung Decortication and Pneumothorax, p. 685, Operative Surgery, C. V. Mosby Co., 5th ed., 1940.

7. Hoyer, L. P., and Claggett, O. T.: Treatment of chronic spontaneous pneumothorax by lobectomy, J. Thor. Surg., 15:418, 1946.

8. Kipfer, R.: Kasuistischer Beitrag zur Pathogenese des Spontanpneumothorax und zu seiner Therapie mit Hilfe der Thorakoskopie und endopleuralen Kaustik, Verhandl. d. deutsch. Gesellsch. f. inn. Med. Kong., 44:193, 1932.

9. Medici, F. A.: Resultados de la pleurodesis por el metodo de Bethune en el neumotorax espontaneo benigno, An. Cated. de pat. y clin. tuberc., 6:106, 1944.

10. Movitt, E. R., Smith, J. V., and Eloesser, L.: Treatment of spontaneous pneumothorax, Dis. of Chest, 13:221, 1947.

11. Sarot, I. A.: Extrapleural pneumonectomy and pleurectomy in pulmonary tuberculosis, Thorax, 4:173, 1949.

12. Tyson, M. D., and Crandall, W. B.: The surgical treatment of recurrent ideopathic spontaneous pneumothorax, J. Thor. Surg., 10:566, 1941.


## Cortisone in Treatment of Trichinosis


JOSEPH F. SADUSK, JR., M.D., Oakland


WHILE TRICHINOSIS is generally regarded as a benign disease, it is well known that the clinical course may at times be quite severe; and indeed mortality rates of from approximately 3 to 6 per cent have been recorded.[3, 6, 9]

Until very recently, the only recognized therapeutic procedure was that of bed rest and supportive medication. Scattered reports on the use of corticotropin (ACTH)[4] and cortisone[7, 8] indicate that these agents may be of considerable value in the treatment of trichinosis.

The purpose of this communication is to report the treatment of a case of trichinosis with cortisone, to show that this agent was most effective in the amelioration of symptoms, and to attempt to define the appropriate dosage of the drug.

#### REPORT OF A CASE

A 31-year-old traveling salesman was admitted to the hospital on the thirteenth day of illness with complaints of fever, chills, muscle aching and pain, sweats, severe frontal headache and swelling of the eyelids.

The illness began November 27, 1952, with a sudden severe chill and temperature rise to approximately 101° F. The patient then perspired profusely throughout the night. The next day he felt well and was essentially asymptomatic until December 2, at which time he noticed puffiness of the lower eyelids which rapidly spread in a day or so to the upper lids and finally involved the entire periorbital area. On December 5, the patient suddenly had another chill. The temperature rose rapidly, and there was muscle aching of a generalized nature but with particular severity in the anterior thigh muscles. On December 6 another severe shaking chill occurred and chills and aching of the muscles continued but the periorbital edema began subsiding slowly. Rather severe frontal headache developed. Temperatures ranged between 100.2° and 102.4° F. when he was admitted to hospital. There was no history of skin eruption or diarrhea.

The only infectious disease noted in the patient's history was measles. The patient, traveling by automobile throughout the rural districts of California, frequently ate inadequately cooked "hamburgers," possibly containing pork, at roadside stands.

Upon physical examination the patient was observed to be well developed and well nourished. He appeared acutely ill and prostrated. The temperature was 102.0°, the pulse rate 96, and the blood pressure 120/40 mm. of mercury. The skin was flushed, sweating and hot. No skin eruption was noted. There was a moderate tenderness of the anterior muscles of the thigh. The conjunctivae were clear. Moderate bilateral periorbital edema was


From the Medical Service, the Samuel H. Merritt Hospital, Oakland 9.